

Appl. No. 10/719,591
Dated 10-21-05
Our Ref.: 02-760-2

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1-22 (previously cancelled)

23. (previously presented) System for cleaning tubes of tube bundle type heat exchangers including a plurality of tubes arranged in parallel between two chambers and in which a fluid medium circulates at a temperature greater than 120°C, comprising cleaning bodies for cleaning said tubes of deposits at inner walls of said tubes, wherein said cleaning bodies have contact surfaces for contacting inner walls of said tubes and removing said deposits, and wherein said cleaning bodies are made of a material which maintains said contact surfaces at temperatures greater than 120°C.

24. (previously presented) The system of claim 23, wherein said fluid medium is crude oil and wherein said material maintains said contact surfaces when in contact with crude oil.

25. (previously presented) The system of claim 23, wherein said cleaning bodies are made of a material selected relative to said fluid medium whereby said cleaning bodies are freely transported in said fluid medium when flowing, and sink or rise in said fluid medium when stagnant.

26. (previously presented) The system of claim 23, wherein said cleaning bodies have said contact surfaces of a size selected to be forced against the tube inner wall.

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27. (previously presented) The system of claim 23, further comprising means for collecting said cleaning bodies after they are transported through said tubes, and for introducing said cleaning bodies into inlet openings of said tubes.

28. (previously presented) The system of claim 27, further comprising a catching device for catching said cleaning bodies after passing through said tubes.

29. (currently amended)) The system of claim 28, wherein said catching device comprises a filter or a moveable or fixed sieve in a recycling conduit for said cleaning bodies between an ~~inlet~~ outlet and an ~~outlet~~ inlet ~~side~~ side of said heat exchanger.

30. (currently amended)) The system of claim 29, further comprising a lock, positioned downstream of the catching device, for ~~filling~~ filling, retrieving and intermediate storage of said cleaning bodies during interruption of tube cleaning.

31. (previously presented) Cleaning bodies for systems that clean tubes of heat exchangers, in particular tube-bundle type heat exchangers including a plurality of tubes arranged in parallel between two chambers and in which a fluid medium circulates at a temperature greater than 120°C, wherein said cleaning bodies have contact surfaces for contacting inner walls of said tubes and removing deposits, and wherein said cleaning bodies are made of a material which maintains said contact surfaces at temperatures greater than 120°C.

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32. (previously presented) Cleaning bodies according to claim 31, wherein said fluid medium is crude oil and wherein said material maintains said contact surfaces when in contact with crude oil.
33. (previously presented) Cleaning bodies of claim 31, wherein said cleaning bodies have said contact surfaces of a size selected to be forced against the tube inner wall.
34. (previously presented) Cleaning bodies according to claim 31, wherein said cleaning bodies comprise spherical resilient rolling bodies having a cleaning surface, and wherein an entire surface of said cleaning bodies forms said contact surface for removing deposits from the tube inner wall.
35. (previously presented) Cleaning bodies according to claim 31, wherein said cleaning bodies have an outer diameter in an uncompressed state which is greater than the inner diameter of said tubes and which adapts to said inner diameter when said cleaning bodies are introduced into inlet openings of said tubes and are resiliently compressed therein.
36. (previously presented) Cleaning bodies according claim 31, wherein said cleaning bodies comprise an inner buoyancy element and an outer cleaning element.
37. (previously presented) Cleaning bodies according to claim 36, wherein said buoyancy element comprises one or more pressure resistant hollow bodies.

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38. (previously presented) Cleaning bodies according to claim 36, wherein said buoyancy element comprises a metal material.

39. (previously presented) Cleaning bodies according to claim 36, wherein said buoyancy element comprises bodies made of metal foam.

40. (previously presented) Cleaning bodies according to claim 36, wherein the cleaning bodies comprise a cleaning element which forms the contact surface and comprises at least one of a metal lamellae, knitted metal, metal mesh, metal foil, and a layer of abrasive material attached either directly to said buoyancy element or to an intermediate element.

41. (previously presented) Cleaning bodies according to claim 36, wherein a resilient elasticity medium carries said cleaning element.

42. (previously presented) Cleaning bodies according to claim 31, wherein said cleaning bodies comprise at least a downstream buoyancy element and an upstream cleaning element, downstream and upstream being with respect to a flow direction of liquid flow medium in said tubes.

43. (previously presented) Cleaning bodies according to claim 42, wherein each buoyancy element has a ball-shaped or spherical form and is made of metal sheeting or a high-temperature resistant plastics material.

44. (previously presented) Cleaning bodies according to claim 42, wherein each cleaning element is leaf or disk shaped, has a

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circular form and is made of spring metal, and carries a crown of resilient lamellae acting as contact surface and contacting the inner wall of the tube.

45. (previously presented) Cleaning bodies according to claim 42, wherein a connection between said buoyancy body and said cleaning element allows limited relative axial movement.

46. (previously presented) Cleaning bodies according to claim 45, wherein the connection further allows limited relative radial movement of said buoyancy body and said cleaning element.

47. (previously presented) Cleaning bodies according to claim 44, wherein said cleaning element has clover-leaf-shaped lamellae which are separated from one another by a gap.

48. (previously presented) Cleaning bodies according to claim 31, wherein a buoyancy element is arranged on each side of said cleaning element.

49. (previously presented) Cleaning bodies according to claim 36, wherein the material of said cleaning element, said resilient medium and said buoyancy element are resistant to temperatures greater than or equal to 120°C as well as resistant to aggressive media, such as crude oil.

50. (previously presented) Cleaning bodies according to claim 49, wherein the material is metal.

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51. (previously presented) Cleaning bodies according to claim 31, wherein said cleaning bodies are formed as roller shaped metal brushes.